

# **Exhibit 8**

**DECLARATION OF JAMES E. YURGEALITIS**

I, James E. Yurgealitis, declare as follows:

1. I am currently Self Employed as a Legal and Forensic Consultant providing firearms related technical and public policy consulting, forensic case reviews and testing and training services to corporations, legal counsel, and the public sector. During my previous 26-year career as a Federal Law Enforcement Officer, I have been recognized, and testified as, an expert witness in numerous local, state and federal courts. I have toured numerous firearms and ammunition manufacturer's facilities both in the United States and overseas. I maintain a personal library of firearms and ammunition related books and periodicals and maintain contact with other recognized experts in the field. My final assignment in government service was as Senior Special Agent / Program Manager for Forensic Services for the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), U.S. Department of Justice, a position I held for nine years. During that time, I was responsible for all Bureau firearms and forensic firearms related training and research at the ATF National Laboratory Center in Ammendale, Maryland.

2. My credentials, training, background and experience are stated in my curriculum vitae, a true and correct copy of which is attached as Exhibit A. My credentials, training, background and experience as an expert witness are detailed on my Statement of Qualifications, a true and correct copy of which is attached as Exhibit B.

3. I have been retained by the Office of the Attorney General of Illinois to provide expert testimony in litigation challenging various aspects of Illinois Public Act 102-1116, also known as the Protect Illinois Communities Act (the Act). As of the date of this declaration, the scope of my engagement includes providing expert testimony in the following cases: *Harrel v. Raoul*, Case No. 23-cv-141-SPM (S.D. Ill.); *Langley v. Kelly*, Case No. 23-cv-192-NJR (S.D. Ill.); *Barnett v. Raoul*, 23-cv-209-RJD (S.D. Ill.); *Federal Firearms Licensees of Illinois v. Pritzker*,

23-cv-215-NJR (S.D. Ill.); *Barnett v. Raoul*, 23-cv-209-RJD (S.D. Ill.); and *Herrera v. Raoul*, 23-cv-532 (N.D. Ill.). I have reviewed the provisions of Public Act 102-1116 being challenged in this case. I am being compensated at a rate of \$400 per hour for my work on this declaration, and \$1600 per travel + work day.

### **OPINIONS**

4. As discussed in this report, many of the firearms covered by the Act can directly trace their origins to weapons developed for use in combat. As such, they were never initially intended for general distribution / sale to the public.

5. As tragically demonstrated by recent mass shootings such as the Pulse Nightclub in Orlando Florida in 2016 (49 fatalities, 50+ wounded), the 2017 Las Vegas shooting (60 fatalities, 400+ wounded), the 2022 Uvalde Texas School shooting (21 fatalities, 17 wounded) and the July 4<sup>th</sup> 2022 shooting in Highland Park (7 fatalities, 48 wounded), the assault weapons (in conjunction with high capacity magazines) as defined under the Act are capable of inflicting significant carnage upon civilians in a short period of time.

6. Additionally, assault weapons as prohibited under the Act pose a significant risk to law enforcement officers. It has been my experience that soft body armor issued to most Uniformed Officers has a “Level II” or “Level IIIA” National Institute of Justice (NIJ) protection rating. These two ratings are suitable for protection against most handgun bullets as those projectiles range up to a 1200FPS (+ or -) velocity. Rifle caliber assault weapons (AR & AK type) can, as stated previously in this report, achieve muzzle velocities of 3200FPS (+ or -) which can readily penetrate Level II & IIIA Body Armor (as well as some Level III hard body armor which is not universal standard issue amongst law enforcement agencies nationwide). Not only do the firearms banned under the Act pose a threat to overall public safety they increase the likelihood

that first responders charged with stopping such a threat may be injured or killed in the performance of their duty.

## **DISCUSSION**

### **I. Firearms Terminology, Types, And Operation.**

#### **A. Handguns And Long Guns.**

7. Modern firearms as currently manufactured for civilian ownership fall into two general types: handguns and long guns (or shoulder weapons).

##### **i. Handguns.**

8. **Handguns.** Handguns are generally defined as a firearm having a short stock (grip), and are designed to be held, and fired, with one hand. The term “handgun” defines two distinct types of modern firearms: the revolver and the semi-automatic pistol.

9. **Revolver.** A revolver is a handgun designed and manufactured with a revolving cylinder to contain, chamber, and feed multiple rounds of ammunition. In a modern double action revolver, pulling the trigger rotates the cylinder bringing an unfired cartridge of ammunition in line with the barrel and firing pin. Pulling the trigger also cocks the hammer and then releases it either directly (or indirectly via a firing pin) to strike the primer of the cartridge initiating the firing sequence as stated previously. In this type of revolver, the trigger must again be pulled to rotate the cylinder in order to fire another cartridge. When all cartridges have been fired, the cylinder is unlocked from the frame and swings out to facilitate removal of expended cartridge casings and insertion of unfired cartridges. The cylinder is then closed and relocked within the frame and the handgun is again ready to fire when the trigger is pulled.

10. **Semi-automatic pistol.** A semi-automatic pistol is a handgun designed and manufactured with the firing chamber as an integral part of the barrel and utilizes a “box” magazine to contain and feed multiple rounds of ammunition. In this type of handgun, generally,

the box magazine is inserted into the firearm, the slide or bolt is pulled back and released which springs forward and a cartridge into the chamber. When the trigger is pulled, a firing pin or striker is released which impacts the primer of the cartridge and initiates the firing sequence of the ammunition. In most pistols, a portion of the recoil or gas pressure generated by firing the cartridge is utilized to move the slide rearward, extract and eject the expended cartridge case and chamber another round from the magazine. This sequence can be repeated by pulling the trigger once for each shot. The pistol can then be reloaded by removing the empty magazine and inserting a loaded magazine.

## **ii. Long Guns.**

11. In terms of modern firearms manufacture, long guns are generally of two distinct types: rifles and shotguns.

12. **Rifle.** A rifle is a firearm which is designed and intended to be fired from the shoulder. It fires a single shot through a rifled bore for each pull of the trigger.

13. **Shotgun.** A shotgun is a firearm that is also designed and intended to be fired from the shoulder. It fires either a number of ball shot (commonly termed “buckshot” or “birdshot”) or a single projectile (commonly termed a “slug”) through a smooth (non rifled) bore for each pull of the trigger.

14. In terms of “types” of rifle there are numerous variations. All of these variations, generally speaking, are defined and distinguished by the way they are loaded and reloaded.

15. **Single-shot rifle.** For example, single-shot rifles fire one shot for each pull of the trigger. They have no internal or external magazine capacity and must be reloaded with a new unfired cartridge by hand for each shot. Many of these have a hinged or “break open” receiver to facilitate loading and unloading.

16. **Pump action rifle.** A pump action rifle requires the operator to manually manipulate a forearm piece which is traditionally found underneath the barrel. After firing, the forearm is pulled backward which unlocks the bolt, extracts and ejects the fired cartridge case. Pushing the slide forward feeds an unfired cartridge from the magazine, cocks the firearm mechanism and locks the bolt for a successive shot. Pump action rifles have been manufactured with both tubular and detachable box magazines.

17. **Bolt action rifle.** Bolt action rifles require the operator to manually manipulate the bolt of the rifle. After firing, the bolt is first unlocked from the chamber and then moved rearward. This action also extracts and ejects the expended cartridge case. The bolt is then moved forward which feeds an unfired cartridge from the magazine into the chamber. Once the bolt is then again locked by the operator, it is ready to fire. Bolt action rifles usually have an internal fixed magazine or tubular magazine which will facilitate reloading via manipulation of the bolt until that capacity is exhausted. Bolt action rifles were generally the choice among hunters and military forces through the end of World War II.

18. **Lever action rifle.** A lever action rifle is similar to the bolt action rifle in that the operator is required to manipulate the mechanism of the firearm. A lever at the bottom of the receiver of the rifle is manipulated in and up and down motion in order to unlock the bolt and move it rearward, extract and eject the expended cartridge case, feed an unfired cartridge into the chamber and lock it. This action is required for each shot fired through the rifle. Generally speaking lever action rifles are usually manufactured with tubular magazines which will vary in capacity depending on the caliber of the firearm.

19. **Semi-automatic rifle.** A semi-automatic rifle utilizes the energy generated by the firing of the cartridge to power the cycle of fire. This is accomplished by siphoning off a portion of the gases generated by firing to operate the mechanism or by utilizing the recoil generated by

firing much as in a semi-automatic pistol as described previously. Once loaded, the operation of this cycle of fire is not dependent on the operator to effect any portion of the process other than to pull the trigger. Semi-automatic rifles are, and have been previously, manufactured with both fixed internal magazines and a capacity to accept detachable external magazines. As such this type of rifle is capable of firing with each pull of the trigger until the supply of ammunition is exhausted. As stated previously, the majority of military firearms through World War II were bolt action. The exception to this rule was the United States entering the war with the semi-automatic M1 (Garand) .30-06 caliber rifle as standard issue. The Garand had a fixed internal magazine with an eight round capacity.

20. Modern shotguns, as stated previously in regard to rifles, are generally classified and characterized by their operating system, (i.e. the manner in which they function, are loaded and are reloaded). Additionally in the case of shotguns with multiple barrels they are defined by placement or orientation of same.

21. **Single-shot shotguns.** Single-shot shotguns function similarly to the single-shot rifle. They may have a hinged receiver which allows the operator to open the action at chamber area to facilitate loading and unloading of the firearm. There are also single shot models that are loaded and unloaded through a bolt action mechanism and have no additional magazine capacity.

22. **Bolt action shotguns** Bolt action shotguns are manufactured, as stated above as single shot, or with internal or detachable magazines to facilitate easier and faster reloading. They function in the same way as a bolt action rifle and require manual manipulation of the bolt by the operator to unload and reload.

23. **Level action shotguns.** Level action shotguns again function in the same fashion as a similarly designed rifle. Manual manipulation of the lever is required for successive shots.

24. **Pump action shotguns.** Pump action shotguns have the same general operating system as a similarly designed rifle. The “action” of the shotgun must be worked forward and back by the operator to unlock the bolt, extract and eject the expended shotgun shell, reload and relock the bolt for firing.

25. **Semi-automatic shotguns.** Semi-automatic shotguns, as with their rifle caliber counterparts, utilize energy (either recoil or gas pressure) generated by firing ammunition to “power” the operating system of the firearm. These are manufactured with a number of different magazines, both internal and fixed, as well as external and detachable. They are capable of firing a single shot with each pull of the trigger until the supply of ammunition in the magazine is exhausted.

26. **Break open, double barrel, and “tip up” shotguns.** Break open, double barrel, and “tip up” shotguns have a hinged receiver which facilitates access to the rear of the chamber for unloading and reloading. They are manufactured in single shot and double barrel variations. Double barrel variations are further delineated by the placement of their barrels. Side-by-side shotguns have two barrels situated next to one another in a horizontal arrangement. Over-and-under shotguns have two barrels superimposed upon one another in a vertical plane. The mechanisms in each of these allow staggered firing of each of the two barrels with a separate pull of the trigger. When the hinged action is opened, the expended shotgun shell hulls can be manually extracted although more complex designs with auto ejectors perform that function when “opened” without action by the operator.

#### **B. General Firearms Definitions.**

27. In discussing modern firearms, it is important to understand how they are defined under statute, how they function and the differences between types commonly found and available to the public.



28. Additional terms often used when discussing modern firearms are semi-automatic, full-automatic, select fire, rifling, caliber and gauge. I define these terms as follows:

29. **Semi-Automatic.** Semi-automatic fire refers to a repeating firearm that fires one shot for each pull of the trigger until the ammunition supply is exhausted. The energy of the fired cartridge is utilized to cycle the mechanism of the firearm to feed and chamber the next shot.

30. **Full-automatic.** Full-automatic refers to a firearm that will continuously fire successive shots when the trigger is pulled, and will only stop when the trigger is released or the supply of ammunition is exhausted. Commonly referred to as a machine gun.

31. **Select Fire.** A select fire firearm is capable of switching between and functioning in either full- or semi-automatic fire mode.

32. **Rifling.** Rifling refers to a series of grooves cut or impressed inside the barrel in a spiral pattern. The “high” portions of these patterns are called “lands.” The “lower” portion of this pattern are called “grooves.” When a projectile (or bullet) is fired in a “rifled” firearm, it comes into contact with the lands as it leaves the chamber and begins to travel down the barrel. Because the lands are oriented in a spiral pattern, the rifling imparts a spin to the projectile which improves stability and accuracy.

33. **Caliber.** Caliber is a dimensional measurement of the inside (or bore) of a rifled barrel. In the United States, caliber is traditionally expressed in fractions of an inch. For example, a .22 caliber firearm is designed to chamber and fire a projectile which measures .22 inches (or slightly less than a quarter of an inch). A .50 caliber firearm chambers and fires a projectile which is approximately a half inch in diameter.<sup>1</sup>

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<sup>1</sup> In Europe, and, the majority of other countries utilizing the metric system, caliber has historically been expressed in millimeters (mm). Therefore a 9mm firearm is designed to chamber and fire a projectile with a diameter of 9mm. European caliber designations may also include measurement of the length of the cartridge case (9x19mm, 7.62x39mm etc.).

34. It is important to note for the purposes of this report that the caliber designation of any given ammunition cartridge usually refers only to the diameter of the projectile (bullet) and not the relative “power” of the cartridge itself (in terms of muzzle energy, effective range and muzzle velocity). For example, there is an important distinction between cartridges commonly referred to as .22 caliber and cartridges commonly referred to as .223 caliber.

35. .22 caliber ammunition is a popular and relatively low power cartridge developed in the 1880’s. It is also known as “.22 rimfire” as the primer mixture in the cartridge is seated in the rim of the cartridge and not contained in a separate primer cup in the cartridge base. It is commonly used for target shooting as well as hunting small game and can be fired from both handguns and rifles chambered in that caliber. Bullet weights for .22 caliber projectiles / bullets are typically between 30-60 grains (0.08 to 0.13 ounces). Muzzle velocities are usually in the 1100-1300 feet per second (fps) range.

36. .223 caliber ammunition by comparison is a high velocity cartridge developed in the 1950’s in part for use in the original AR-15 and M-16 rifles. It is a “centerfire cartridge.” Although the diameter of the projectile / bullet is only slightly greater (approximately the width of a human hair) than the .22 caliber cartridge mentioned previously, it is a vastly more powerful cartridge in terms of muzzle velocity and range. This caliber ammunition is also somewhat interchangeable with 5.56mm ammunition. Here is a side-by-side comparison of .223 (left) and .22 caliber cartridges (right) with a quarter for size reference:

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A number of firearm calibers widely manufactured have two separate caliber designations, one in inch measurements and one in metric, which are equivalent and interchangeable. For example .380 ACP caliber ammunition in the US is referred to as 9x17mm caliber in Europe.



37. Common bullet weights for .223 / 5.56mm caliber projectiles are 50 to 62 grains + or- (0.11 to 0.14 ounces)—heavier than .22 caliber projectiles. Common muzzle velocities are approximately 3,200 to 3,500 feet per second—about three times as fast as .22 caliber projectiles. A heavier bullet and increased velocity equate to more of the cartridge’s energy being transferred to the target. The National Rifle Association (NRA) American Rifleman Magazine tested the U.S. Army’s new .223 caliber cartridge (M855A1) in 2014 and the results are published here: <https://www.americanrifleman.org/content/testing-the-army-s-m855a1-standard-ball-cartridge/>.

38. **Gauge.** Gauge is a dimensional measurement which is traditionally used to denote the bore of a non-rifled or “smoothbore” firearm (i.e. a shotgun). Shotguns were initially designed to fire a mass of round shot as opposed to one solid projectile, and therefore a caliber designation is not readily applicable. Gauge refers to the number of lead spheres which will fit inside the bore and equal one pound. For example, in a 12 gauge shotgun, you can fit 12 spheres of lead, which are approximately 18.52mm or .73 inches in diameter, the total weight of which will equal one pound. If the diameter of the spheres are increased, it will require less of them to equal one pound.

Therefore the smaller the “gauge” the larger the dimension of the bore. The exception to this measurement system is the .410 gauge shotgun which is actually a caliber designation.

## **II. Recent Development And Evolution Of Firearms With Features Designed for Military Purposes.**

39. In recent years, there has been an increase in the popularity and availability of semi-automatic rifles, pistols, and shotguns with features initially designed (or patterned after those designed) for a military purpose. It is important to discuss the history of the development and evolution of firearms with these features.

### **A. Assault Rifle Development And Evolution.**

40. The first “assault rifle” or “assault weapon” was the German StG 44 (Sturmgewehr Model 1944), which appeared in production form late in World War II. Earlier pre-production variants included the MP 42 and MP 43 (Machinenpistol 1942 and 1943 respectively). The Germans termed the rifle “Sturmgewehr”, literally “Storm Rifle”, and a number of the features included utilization of a portion of the gas generated by the burning cartridge propellant to operate the rifle, extensive use of steel stampings in its construction, a detachable magazine, a separate pistol style grip (not integrated with the shoulder stock), a bayonet mounting lug and a threaded barrel to facilitate the attachment of a grenade launcher. It fired a cartridge that was smaller dimensionally and less “powerful” (in terms of muzzle velocity and foot pounds of energy) than the standard 8mm Mauser cartridge in use by the German Army in their issued bolt action Mauser rifles.



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41. It is important to note that the features designed into the German StG 44 were intended to increase the effectiveness of the individual soldier in combat:

42. **Gas-powered semiautomatic fire.** Gas-powered semiautomatic fire enabled more rapid fire than was possible using standard-issue bolt action rifles.

43. **Steel stampings.** Steel stampings made for a lighter weapon increasing the amount of ammunition an individual combatant could carry and / or increasing mobility. Additionally they were easier and less expensive to manufacture.

44. **Detachable magazine.** Detachable magazines allow more rapid re-loading than previous standard issue bolt action firearms.

45. **Separate pistol style grip.** A separate pistol style grip enhanced the ability of combat soldiers to quickly maneuver their firearms into firing position and retain stability for more precise aim while firing rapidly.

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<sup>2</sup> Image source –Peter Suci, “Sturmgewehr, the First Assault Rifle,” Recoil: The Ultimate Firearms Destination for the Gun Lifestyle, June 19, 206, available at <https://www.recoilweb.com/sturmgewehr-the-first-assault-rifle-100907.html>

46. **Barrel shroud.** A barrel shroud encircles and protects the end of the barrel, keeping the barrel safe from damage caused by collision with objects and giving the soldier using the firearm an auxiliary grip on the barrel without burning his hand.

47. **Bayonet mounting lug.** Bayonet mounting lug this feature provided combat soldiers with an additional weapon for use in close combat.

48. **Threaded Barrel.** A threaded barrel allowed for the attachment of grenade launcher (on this particular rifle), providing combat soldiers with an additional weapon, albeit for use at a greater distance.

49. It is widely accepted that in the design of military small arms, “form follows function” and each of these innovations primarily served to increase the firepower and lethality of individual combatant.

50. Following the end of the war, captured StG 44’s were analyzed by the Allies and although there was reluctance to move to a smaller caliber cartridge, a number of the features of the StG 44 found favor in the design of successive European, American, and Eastern Bloc military rifles. Noted firearm expert and historian Jim Supica wrote in his forward to the book “Guns:”

“Most military establishments hesitated to “downsize” the range and power of their primary rifles in the early Cold War years. The semi-auto detachable magazine concept was an obvious success and there was something to be said for full auto capability.”<sup>3</sup>

He further writes:

“However the assault rifle concept wouldn’t go away. The Soviet Union accepted the lower power round idea in its fixed magazine semi-auto chambered for an intermediate power 7.62 x 39 mm round in 1945, the SKS, which saw wide distribution and production in Soviet client states.”<sup>4</sup>

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<sup>3</sup> Supica, Guns (TAJ Books 2006). PP. 26-28

<sup>4</sup> *Id.*

51. Two years later in 1947, the USSR followed the SKS with what Supica terms “the quintessential assault rifle - the Kalashnikov designed AK-47.”<sup>5</sup>

52. The design of the AK-47 carried forward a number of the features introduced on the German StG 44. These features include a gas powered operating system, use of steel stampings in its construction, a separate pistol grip, separate shoulder stock, a detachable magazine, a bayonet lug and provision for attachment of a grenade launcher. Due to the separate stock and pistol grip the AK, much like the StG 44, also utilized a barrel shroud / or foregrip on the forward third of the rifle. Some variations of the early AK-47’s (AKM) also featured a “compensator” at the muzzle that deflected gas upward and to the right to compensate for the rifle’s tendency to kick up and to the right with every shot.

53. In the 1950’s, many countries sought to replace World War I and World War II vintage bolt action and semi-automatic rifles with these newer and more effective designs. With the birth of the North Atlantic Treaty Organization (NATO) however, utilization of Soviet Bloc AK or SKS assault rifles was not possible. Accordingly, a number of firearms manufacturers outside the Soviet sphere of influence developed military rifles that carried forward these same features to one extent or another. Fabrique Nationale (FN) of Herstal, Belgium and Heckler Koch (HK) of Oberndorf, Germany are two noteworthy examples.

54. FN developed the FN-FAL (Fusil Automatique Leger) and HK the G3 which found a ready market amongst nations that did not favor the Soviet AK type designs. Both incorporated features which like the AK, were derived directly from the StG 44. Their designs featured some parts made from metal stampings as opposed to heavier and more expensive machined steel pieces. A separate pistol grip, shoulder stock, detachable magazine, and barrel shroud followed

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<sup>5</sup> *Id.*

the basic design of the StG 44. A flash hider and / or muzzle brake have appeared in production variations of both rifles. These rifles were destined from inception to become widely exported as the domestic market in both countries was relatively limited. The FN-FAL and G3 have been in production since the 1950's and both FN and HK have licensed production to numerous countries in South America, Africa, and the Middle East.

55. In the United States, progress in this arena moved at a significantly slower pace.

56. The prevailing wisdom in the United States was to stay away from lighter, smaller rifle calibers and cartridges as the .30-06 cartridge used in the M-1 Garand Rifle during World War II had proven to be more than successful. Their initial answer to the burgeoning move towards assault rifles was a variation of the basic M-1 Garand operating system, the T44, or M-14. Outwardly, the M-14 retained a full length wood stock as did the Garand; however, it featured a detachable magazine, select fire (both semi-automatic and full automatic) capability, and a flash hider. It competed directly against the FN-FAL (designated T88) in U.S. Army trials and was selected in 1957.

57. In the mid 1950's, Eugene Stoner, the chief Engineer of the American company ArmaLite Corporation, developed a number of lightweight assault rifle designs which resulted in the AR-10 in .308 caliber. Its design closely followed what was now becoming standard assault rifle design, i.e., light weight (aluminum forged receivers as opposed to machined steel), separate pistol grip and shoulder stock, foregrip / barrel shroud, detachable magazine, and numerous flash hider / muzzle brake variations. ArmaLite continued to refine the basic design of the AR-10 which resulted in the AR-15. The AR-15 was designed to chamber and fire the 5.56 x 45mm cartridge (somewhat interchangeable with .223 Remington caliber).

58. In 1961, the Department of Defense purchased a quantity of AR-15 rifles from Colt for evaluation. A number of these were subsequently shipped to US Army advisors in Vietnam to



test their suitability for issue to South Vietnamese Army forces. Following the field evaluation the Department of Defense Advanced Research Projects Agency prepared a report (AD-343778, dated August 20, 1962) summarizing the results. Amongst the data compiled via surveys of the US Army Advisors are a number of comments regarding actual use in the field and the results. These comments describe various catastrophic injuries to Viet Cong Combatants who were shot by AR-15, including severing of limbs and decapitation.<sup>6</sup>

59. This rifle was adopted as standard issue by the U.S. Army in the mid 1960's. The production of the rifle had been licensed to Colt, and initially the model designation was, as produced, AR-15. Later, after a series of engineering changes, the standard U.S. military designation was changed to M-16. When first deployed as a standard issue rifle for US Military Forces, the AR-15 / M-16 platform was maligned as unreliable and prone to jamming. This was due, in part, to inadequate maintenance by the operators themselves. Once the problems were addressed and rectified, the rifle proved to be as reliable and accurate as the AK type rifles deployed by the North Vietnamese and Viet Cong.

60. Performance in terms of muzzle velocity was also a consideration. The 7.62x51mm cartridge has a muzzle velocity of approximately 3200 feet per second (fps). The 5.56 cartridge has approximately the same velocity (for reference a 9mm pistol cartridge has a muzzle velocity of approximately 1100 fps). 5.56mm bullets, upon contacting tissue will "yaw" (begin to rotate on its axis) which contributes to the creation of both temporary and permanent large wound cavities. Handgun bullets, because they are heavier and travelling at a lower velocity, do not typically yaw upon contact with tissue and do not create as large of a wound cavity nor commensurate destruction of tissue. The yaw movement of a 5.56/.223 bullet can also cause it to fragment upon

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<sup>6</sup> Advanced Research Projects Agency, Office of the Secretary of Defense, Field Test Report, AR-15 Armalite Rifle, at 24 (July 31, 1962), available at <https://apps.dtic.mil/sti/pdfs/AD0343778.pdf>.

striking bone which contributes to additional tissue damage not immediately adjacent to the cavity itself.

61. Noted Wound Ballistics expert Vincent DiMaio in “Gunshot Wounds” writes:

“As the bullet enters, the body, there is ‘tail splash’ or backward hurling of injured tissue. This material may be ejected from the entrance. The bullet passes through the target, creating a large temporary cavity whose maximum diameter is up to 11-12.5 times the diameter of the projectile. The maximum diameter of the cavity occurs at the point at which the maximum rate of loss of kinetic energy occurs. This occurs at the point where the bullet is at maximum yaw, i.e., turned sideways (at a 90-degree angle to the path) and / or when it fragments. If fragmentation does not occur and the path is long enough, the yawing continues until the bullet rotates 180 degrees and ends up in a base-forward position. The bullet will continue traveling base first with little or no yaw as this position puts the center of mass forward.”<sup>7</sup>

“The temporary cavity will undulate for 5-10 msec before coming to rest as a permanent track. Positive and negative pressures alternate in the wound track, with resultant sucking of foreign material and bacteria into the track from both entrance and exit. In high-velocity centerfire rifle wounds, the expanding walls of the temporary cavity are capable of doing severe damage. There is compression, stretching and shearing of the displaced tissue. Injuries to blood vessels, nerves, or organs not struck by the bullet, and a distance from the path, can occur as can fractures of bones, though, in the case of fractures, this is relatively rare. In the author’s experience, fractures usually occur when the bullet perforates an intercostal space fracturing ribs above and below the bullet path.”<sup>8</sup>

62. Demaio further states,

“Projectile fragmentation can amplify the effects of the temporary cavity increasing the severity of a wound. This is the reason for the effectiveness of the 5.56 x 45-mm cartridge and the M-16 rifle. For the M-193 55-gr. bullet, on the average, the yaw becomes significant at 12 cm with marked tissue disruption occurring most commonly at 15-25 cm due principally to bullet fragmentation.”<sup>9</sup>

63. This video graphically illustrates the temporary wound cavity as described by

DeMaio: <https://www.youtube.com/watch?v=8HM96wpPVoQ>.

64. Colt sought to capitalize on the military acceptance of the AR-15 / M-16 and thereafter shortly began to produce these rifles for sale on the civilian market. The only difference

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<sup>7</sup> DiMaio, *Gunshot Wounds*, 2d (CRC Press LLC, 1999). P. 54

<sup>8</sup> *Id.*, P.55

<sup>9</sup> *Id.*, P.56

between the military and civilian versions was removal of select fire (both semi-automatic and full automatic) capability. The additional features on these rifles intended to enhance their capability as military firearms remained. As the AR-15 / M-16 gained a reputation for reliability in military use, its popularity in terms of sales to the civilian market increased. Arguably, the AR type rifle is in second place behind AK type firearms in terms of production, sale and use by military forces worldwide. This animation thoroughly details the key operational components of the M-16 / AR-15 in both full automatic, semi automatic and burst modes:

<https://www.youtube.com/watch?v=omv85cLfmXU>

### **B. Pistol Caliber Firearms Evolution And Development.**

65. It is important in terms of this particular case also to address the evolution and development of firearms that chamber and fire pistol caliber ammunition, including those known as submachine guns. Submachineguns are defined as machineguns that fire “sub caliber” (i.e. pistol caliber) ammunition. A number of the handguns that are banned under the Act are direct evolutionary descendants of submachine guns initially designed and produced for military use.

66. Many of the construction and design features attributed to assault weapons, and the StG 44, were first utilized in the design and manufacture of mid-20<sup>th</sup> century submachine guns. Nazi Germany entered World War II with the Innovative Maschinenpistole 38 (MP38). It was chambered in 9mm and later, after a number of engineering changes, re-designated as the MP40. It has design features commonly found in later assault weapons including an adjustable stock, separate pistol grip, a detachable magazine and use of steel stampings in its construction.



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67. While the United States initially entered World War II with a military variant of the Thompson .45 caliber sub machinegun, it was heavy and expensive to manufacture because a number of the major components were machined from solid steel. Before the end of the war, the Thompson had been supplemented by the M3 “Greasegun” initially produced by General Motors. The receiver was a stamped and welded sheet metal assembly with an adjustable sliding shoulder stock. Like the MP38 / MP40, it had a separate pistol grip, a sliding / adjustable shoulder stock and a detachable box magazine with a 30 round capacity. In a utilitarian sense it was as effective as the Thompson and, at approximately \$20, it was less than half as expensive.

68. The United Kingdom produced over one million Sten submachine guns during World War II. A rugged and reliable firearm made largely from welded steel stampings, it was utility, reliability and ease of manufacture both combined and perfected. Features shared with the M3 and MP38/MP40 included an adjustable shoulder stock, separate detachable box magazine and, on some variations, a barrel shroud allowing the operator to utilize the area surrounding the barrel as an auxiliary grip point without touching a heated barrel.

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<sup>10</sup> Image source from, Peter Suci, “Hitler Vs. The World: 6 Best World War II Submachine Guns,” 1945 (Jan. 12, 2021) available at. <https://www.19fortyfive.com/2021/01/hitler-vs-the-world-6-best-world-war-ii-submachine-guns/>.

69. Prior to and during World War II, a number of other nations developed submachine guns which followed the same design and construction philosophy. Notable examples include the Soviet PPSH41, the Italian Beretta Model 38/42, and the Swedish Carl Gustav Model 45.

70. Following World War II, most new submachine gun designs continued the design philosophy which combined utility, ease of manufacture and the features of wartime firearms. In the early 1960's, HK introduced the MP5 which became an immensely popular choice for military and law enforcement agencies worldwide due to its inherent reliability and accuracy. It was produced in multiple iterations to include a semi-automatic civilian version as well as a pistol variant without a provision for a shoulder stock (HK SP89). Israeli Military Industries also successfully marketed their UZI sub machinegun for export in select fire, and in civilian semi-automatic variants.

71. Additionally, a number of submachine gun designs proved unsuccessful in terms of military and government sales but nonetheless found a ready market when re-engineered as a semiautomatic pistol. Notable examples include the Cobray MAC-10 (and successive variants) and the Intratec TEC-9, which began life as a Swedish designed submachine gun, the Interdynamic MP-9.

### **III. Features Of Assault Rifles/Assault Weapons Under the Act.**

72. Equipment designed, produced and issued to modern military forces for utilization in the field emphasizes functionality. In terms of small arms designed and produced for military use, form follows function, and features are present to maximize effectiveness. Maximizing effectiveness in terms of military small arms includes the ability to deliver reliable lethality or the ability to incapacitate the chosen target and provide increased survivability for the operator in battle.

73. Numerous assault weapons available for purchase by the public are, save the lack of select fire capability, identical copies of military firearms. As such, they retain a number of features originally designed to maximize their effectiveness in battle. Other firearms available to the public, which were not initially intended for sale to government or military customers, incorporate features which mimic those found on military firearms. There are countless accessories available to add to firearms traditionally considered “sporting firearms” (i.e. those initially designed and manufactured for target shooting or hunting), which brings their functionality more towards the military side of the spectrum and away from the sporting side.

#### **A. Prohibited Firearms And Features Under the Act.**

##### **i. Prohibited Firearms**

74. It is worthy of note here that the Act does not ban all firearms, all semiautomatic firearms, or even all firearms chambered in .223 / 556 (AR) or 7.62x39mm (AK).

75. The Act prohibits a number of enumerated firearms with an obvious military (i.e. non-sporting) heritage.

76. The Act also bans certain weapons based on magazine capacity. I discuss magazine capacity below.

77. Finally, the Act restricts shotguns with revolving cylinders. Such shotguns are known as “street sweeper” shotguns, and are of a design that has not been accepted or adopted for military or law enforcement use by any nation or agency that I am aware of. In terms of legitimate sporting use for either hunting or target shooting or self-defense, I cannot conceive of it having any utility. Shotguns of this type have been classified as a “Destructive Device” by ATF and are subject to additional restrictions under the National Firearms Act of 1935.

## ii. Prohibited Features

78. Included in the Act's definition of "Assault weapon" are a number of features which, when added to certain firearms, bring those firearms under the statutory definition of Assault weapons. Specifically, a semiautomatic rifle or pistol that has the capacity to accept a detachable magazine (or can be readily modified to do so) or a semi-automatic shotgun is considered an assault weapon if the firearm includes one of the features delineated in the Act.

79. As I explain below, each of the features, whether incorporated into the firearm by the manufacturer as standard equipment or subsequently added by the owner as an accessory, can generally be considered capable of increasing the firearm's effectiveness in a combat scenario.

80. **A pistol grip or thumbhole stock** (for rifles and shotguns). A semiautomatic rifle or shotgun that includes a pistol grip (or does not include a shoulder stock) somewhat increases the ability of the operator to conceal the rifle or shotgun and to maneuver the firearm in confined space such as a vehicle. The pistol grip also facilitates easier firing from positions other than the shoulder (firing from the hip or a point position directly in front of the operator).

81. **Protruding foregrip** (rifles, shotguns, pistols). Protruding foregrips allow increased stability of the firearm by the operator. This allows the operator to better control recoil and muzzle climb thus increasing the hit probability of successive shots. A protruding foregrip is not a feature found on traditional sporting firearms. It appeared on some versions of AK based rifles; however, it was not until the advent of the Rail Attachment Systems (RAS) and acceptance by the US Military of same that foregrips for semi-automatic rifles became more widespread. A foregrip on a pistol is considered "any other weapon" under the National Firearms Act and subject to more restrictive controls to include registration in a national database.

82. **Folding/telescoping stocks** (rifles and shotguns). Folding and / or telescoping stocks allow the operator to more easily conceal or maneuver the rifle in a confined space such as a

vehicle. They also facilitate easier or more comfortable firing from positions other than the shoulder. U.S. Military origins for this type of stock can be found on the M1 carbine in World War II when modified for paratrooper use.

83. **Thumbhole stocks.** Thumbhole stocks have traditionally been utilized on firearms for sport and target shooting; however during the Federal Assault Weapons Ban (1994-2004) a number of AK style firearms (amongst others) were equipped with thumbhole stocks to get around the ban's prohibition on pistol grips.

84. **Flash suppressors.** A flash suppressor reduces the muzzle flash, allowing the operator to more easily maintain vision in low light conditions and also helps to conceal the flash from view. This allows the operator to more easily acquire additional targets in a shorter period of time without having to wait for their vision to adjust to a brighter muzzle flash as well as helps conceal the shooter's position.

85. **Grenade launchers.** Without question a grenade launcher has neither a sporting lineage nor a practical application on a civilian firearm. Obviously, a grenade is an offensive military weapon which could result in mass casualties if deployed during a civilian event or public space.

86. **Barrel shroud.** Military semi-automatic and select fire rifles have featured a shroud or hand guard that encircles the barrel since before the onset of World War II. The M1 "Garand" Rifle utilized by the US Military during that conflict incorporated a traditional wooden stock similar to most hunting and sporting rifles of the period. However, it also featured a wooden handguard which covered the top 2/3rds of the barrel. Therefore this design feature is not a recent development. Enclosing the barrel in a shroud serves multiple purposes. In a modern gas operated semi-automatic military rifle, it serves to protect the gas tube / piston mechanism from inadvertent



damage. It also provides additional grip space for the operator to steady and control the rifle during rapid, repeat firing without getting burned by the hot barrel.

87. **Threaded barrel.** A threaded barrel allows for attachment of a suppressor (commonly referred to as a silencer) which allows the operator to better conceal themselves from their target by reducing the report of their firearm. It also allows the attachment of some flash suppressors with the resultant effect mentioned previously.

88. **Buffer tube, arm brace, or the like.** Attachment of a brace, when affixed to a rifle caliber pistol effectively mimics the characteristics of a short-barreled rifle (a type of weapon restricted under the National Firearms Act) as it can allow the operator to fire it from the shoulder increasing stability while maintaining concealability.

#### **B. Prohibited “Large Capacity Magazines” Under The Act.**

89. Magazine capacity plays a role in defining Assault weapons under the Act which also restricts possession and sale of large capacity magazines themselves.<sup>11</sup>

90. 10 rounds (in the case of rifles under the Act) or 15 rounds (for pistols under the act) will function as designed with a magazine with a smaller maximum capacity.

91. Generally speaking, modern semi-automatic rifles that are designed, manufactured and marketed as “hunting rifles” traditionally have an internal magazine capacity of less than 10 rounds depending on caliber. For example, the Browning BAR in .30-06 caliber as currently manufactured has an internal magazine capacity of four (4) rounds.

92. Semi-automatic pistols from numerous manufacturers are sold with magazines that would be permitted under the Act. For example, 9mm caliber pistols are available with standard

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<sup>11</sup> The Act limits large capacity magazines to 10 rounds or less for long guns, and 15 rounds or less for handguns.

magazines with a capacity of 15, 10, or as few as 7 rounds. <https://www.sportsmans.com/shooting-gear-gun-supplies/handguns/handguns/c/cat-9mm-luger-pistols>

93. Detachable magazines are available with varying capacities from 5-100 rounds. Generally speaking any firearm designed for a detachable magazine with a capacity exceeding 10 rounds (in the case of rifles under the Act) or 15 rounds (for pistols under the act) will function as designed with a magazine with a smaller maximum capacity.

94. High capacity magazines are not an evolutionary firearms development initially designed or intended for the civilian marketplace. The lineage of high capacity detachable magazines can be traced directly to a military heritage. Magazine fed light machine guns developed or deployed prior to and during World War I and thereafter refined and improved the capability and reliability of this type of feeding mechanism on a large scale. During World War II, the US M-1 .30 caliber carbine featured a detachable magazine however that rifle was intended for use by rear echelon support personnel. Front line Soldiers and Marines were issued the M1 “Garand” rifle in .30-06 caliber with a eight round internal magazine. It was not until 1959 that the US Military adopted a front line rifle (the M-14) with a detachable magazine. When Colt began producing a semi automatic version of the M-16 for sale to the public it was sold with two five round magazines. It was not sold with the 20 round magazines issued with their military contract M-16’s.



**COLT AR-15 SPORTER  
SEMI-AUTOMATIC RIFLE  
.223 CALIBER**

Colt's answer to the demand for a semi-automatic version of the AR-15 automatic rifle purchased by The United States Armed Forces. Painstaking engineering redesign efforts have resulted in a Government-approved conversion of the Colt AR-15 automatic rifle without sacrificing any performance or weight characteristics. The semi-automatic AR-15 Sporter weighs only 6.3 pounds. Its recoil is light and barrel rise minimal.

**MODEL R-6000**

**RETAIL  
PRICE\***  
**\$189.50**

Lightweight • Extremely accurate • Easy to handle • Straight line construction — barrel, bolt, recoil buffer unit and stock assembled in a straight line • Rapid semi-automatic fire is more controllable than with rifles of commercial design • Simple to maintain.

CALIBER	BARREL LENGTH	OVERALL LENGTH	CAPACITY	SIGHTS	SAFETY	WEIGHT
.223	21"	39"	5 rounds	Double tang rear peep sight adjustable for windage. Post type front sight adjustable for elevation.	Rotary safety—selector lever	Approx. 6 $\frac{3}{4}$ lbs.

\*The suggested retail price of the Sporter is \$189.50 and includes two magazines (each blocked for five rounds), sling, flash suppressor, rubber recoil pad, cleaning rod assembly, cleaning brush, and the Colt AR-15 Sporter Operation and Maintenance manual.

Source: <https://thecoltar15resource.com/1964-catalog/>

“Initially, Colt simply added a five round limitation spacer to the 20-round magazine”<sup>12</sup>

95. Without argument, the ability to fire an increased quantity of cartridges without reloading increases the lethality and effectiveness of small arms in combat or the military would not have incorporated this feature. Less time required to reload can equate to more time spent acquiring targets or shooting. As stated previously form follows function in regard to equipment designed and intended for military use.

<sup>12</sup> Bartocci, Christopher R., *The Black Rifle II* (Collector Grade Publications, 2004), P. 263

#### **IV. Rifle Caliber Assault Weapons And Self / Home Defense.**

96. At numerous points throughout their complaints, Plaintiffs allege that self-defense is one of the primary reasons for the purchase of a firearm regulated by the Act. It is my opinion that an AR, AK, or other banned assault weapon is a poor choice for this task.

97. I have been asked on numerous occasions over the past 35 years what firearm I would recommend for home or self-defense. My recommendation is based upon my inquiry in return regarding the individual's (and their family members') personal experience and comfort level with firearms. In over 25-plus years, I have never recommended an AR, AK or other rifle as a home defense weapon.

98. Home defense and / or self-defense situations are rarely, if ever, lengthy shootouts at long ranges with extensive exchanges of gunfire. Assault weapons banned under the Act were designed to be effective at battlefield ranges of up to 500 yards. The typical muzzle velocity of a .223 caliber bullet is 3,200 feet per second (+ or -). Projectiles travelling at velocities found in banned weapons pose a serious risk of over-penetration in most home construction materials such as gypsum board / sheet rock, and typical 2x4 lumber. When this cartridge was designed for the AR-16 / M-16, it was intended to kill or incapacitate enemy combatants at distances of hundreds of yards not dozens of feet.

99. In August 2014 the National Rifle Association's "American Rifleman" published an article by Stanton Wormley: "The AR-15 for Home Defense: Penetration Tests".<sup>13</sup> Wormley conducted penetration tests on nine different types of .223 / 5.56mm ammunition by firing them through simulated wall sections constructed of gypsum board / sheet rock and wooden 2x4 studs. When fired at a 90-degree angle to the walls all nine (including "frangible" rounds designed to

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<sup>13</sup> <https://www.americanrifleman.org/content/the-ar-15-for-home-defense-penetration-tests/>

disintegrate when hitting a hard surface) easily penetrated the wall section as well as water jugs placed three feet behind:

“But just how much energy did the penetrating projectiles carry? All the loads, including the Glaser, exploded one-gallon water jugs placed 3 feet behind the wall sections.”<sup>14</sup>

100. The tests conducted by Wormley also included firing longitudinally through the wall sections resulting in the penetration of three successive 2” thick 2x4 studs by a number of the projectiles. These tests vividly highlight the inherent dangers of utilizing assault weapons with high velocity ammunition in a home defense scenario.

101. In reference to the NRA American Rifleman article mentioned in paragraph 37, current U.S. Army issue .223 caliber ammunition is capable of penetrating 3/8” hardened steel at 350 yards. Potential over-penetration in a confined environment is problematic in terms of risk to bystanders or family members outside the target location. Most jacketed commercially available .223 / 5.56mm ammunition has impressive penetration capabilities in this regard. Additionally, the (former) NATO issue M855 SS109 5.56mm is readily available for purchase by civilians. This ammunition was designed to penetrate up to 3mm of “soft”, (non-hardened) steel. This capability is certainly unnecessary and poses substantial risks to individuals in adjoining rooms, neighboring apartments or other attached dwelling units.

102. During a stressful situation such as a home invasion or break in, there may be multiple steps required by the operator to bring the weapon from a safe condition to a firing condition. Manipulation of a charging handle, safety switch, or inserting a magazine may be difficult to accomplish under stress, particularly if the operator has not adequately trained or practiced with their firearm. Other family members may not be familiar with bringing the weapon to a firing condition or fail to complete adequate steps to do so under duress.

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<sup>14</sup> *Id.*

103. While employed as a Special Agent with ATF, the agency transitioned to an AR type rifle in the early 2000's. Each Agent was required to attend, and successfully complete, a one week / 40 plus hour transition training class in order to familiarize themselves, and qualify, with the firearm. The training included repetitive live fire drills under stressful conditions. Additionally, we were required to requalify with these firearms quarterly and repeat the same drills as during the initial transition training. Nonetheless, I witnessed Agents make errors that resulted in a failure of the weapon to fire during those drills, even though those Agents had performed the drills repeatedly under stress. It is worth noting here that the M4 carbines issued to ATF Field Offices were select fire rifles (i.e. machineguns capable of full automatic fire) that were converted to semi-automatic fire only.

104. Assault pistols are also a poor choice for home defense or personal protection. Due to their weight and length many assault pistols enumerated in the Act require two hands to effectively aim and shoot. (Certainly the same can be said for a rifle.) In a home defense situation, an individual may be required to use one hand to call 911 while attempting to operate a "two handed" firearm with one hand. Such a situation would also preclude the homeowner from utilizing their "non-gun hand" to pick up or guide a small child, elderly or handicapped individual during such an event.

105. Additionally, I am not of the opinion that an abundance of ammunition is a substitute for weapons familiarization and shot placement. Repeated practice and shooting with your chosen firearm will make you a more effective deterrent than the capability to fire more rounds, should deadly force be required.

106. If the individual had a preference for shoulder weapons, I have recommended a pump action 12-gauge shotgun (Remington 870, Mossberg 500 etc.) loaded with 00 Buckshot and stored with the "hammer dropped" on an empty chamber, safety off. The only action required to

bring the shotgun from a safe unloaded condition to a firing condition is to work the pump action of the shotgun. The advantages of this type of firearm and storage condition are unmatched stopping power, low probability of over penetration (as compared to rifle caliber and velocity projectiles) and zero manipulation of safety mechanisms required in high stress situations. The loading / chambering process itself is an audible deterrent. Training and familiarization with this type of a firearm is simple and straightforward.

107. For a handgun, my first inclination is to recommend an eight shot revolver in .38 +P caliber / .357 Magnum (Similar to S&W Model 627, Taurus Model 608, etc.) loaded with hollow point bullets. As with my rationale for recommending a pump action shotgun there are no complicated safety mechanisms to manipulate in a high stress situation, low probability of over penetration and ease of reloading with a speed loader should more than eight shots be required. Revolvers are also easier and less complicated for other family members to learn to operate especially if they have less familiarity with firearms.

108. In terms of a carry handgun, I value concealability over ammunition capacity. The advantage of concealed carry is protection without broadcasting the fact. In a street robbery scenario, I believe the best course of action is to quickly extricate yourself from the “kill zone” and not engage in a protracted gunfight. When I was employed as a Special Agent with ATF, we were issued a Sig Sauer P229 in .40 S&W caliber as a primary duty weapon. We were also given the choice of a Sig Sauer P239 in .40 S&W or a five shot Smith and Wesson Model 640 in .357 Magnum as a backup firearm. When off duty, I carried the S&W 640 and a speed loader extensively as opposed to the P229. I found it easy to conceal and am of the opinion that ten (10) rounds was an adequate amount of ammunition to enable me, or myself and my wife, or child, to extricate myself from a street or retail location robbery should I encounter one. Consequently, I have most often recommended either a lightweight small revolver (S&W Bodyguard, Ruger LCR,

Smith and Wesson Model 36, 640 or variant) carried with a speed loader or a low profile small semiautomatic pistol (Sig Sauer P236, Ruger LCP, Colt Pocketlite etc.) with a spare magazine.

109. Essentially the types of firearms classified as assault weapons under the Act, specifically AR and AK type rifles, are direct developmental descendants of Military weapons designed for use in combat. The ‘civilian’ AR-15 type rifles in .223 / 5.56mm retain the same performance characteristics (in terms of muzzle velocity, range, etc.) as does the military M-16 and its variants (M-16A2, M-4 etc.).

110. According to the US Army Manual 3-22.9 “Rifle Marksmanship M-16A1, M-16A2/3, M-16A4, and M4 Carbine, April 2003” the maximum range of these rifles is 2650-3000 meters. They were not designed, nor are they suitable, for home defense in short range close quarter situations.

FM 3-22.9(FM 23-9)

## CHAPTER 2 CHARACTERISTICS, AMMUNITION, AND ACCESSORIES

*This chapter describes the general components, characteristics, ammunition, and accessories for the M16- and M4-series weapons to include a brief explanation of how to mount the various accessories.*

### 2-1. CHARACTERISTICS

The M16-/M4-series weapons are 5.56-mm, magazine-fed, gas-operated, air-cooled, shoulder-fired weapons. This section describes the general characteristics (Table 2-1) and the components of the M16-/M4-series weapons. Table 2-2 (page 2-2) shows the characteristics of various accessories.

CHARACTERISTIC	M16A1	M16A2/A3	M16A4	M4
<b>WEIGHT (pounds):</b>				
Without magazine and sling	6.35	7.78	9.08	6.49
With sling and loaded:				
20-round magazine	6.75	8.48	9.78	7.19
30-round magazine	7.06	8.79	10.09	7.50
Bayonet knife, M9	1.50	1.50	1.50	1.50
Scabbard	0.30	0.30	0.30	0.30
Sling, M1	0.40	0.40	0.40	0.40
<b>LENGTH (inches):</b>				
Rifle w/bayonet knife	44.25	44.88	44.88	N/A
Overall rifle length	30.00	39.63	39.63	N/A
Buttstock closed	N/A	N/A	N/A	29.75
Buttstock open	N/A	N/A	N/A	33.0
<b>OPERATIONAL CHARACTERISTICS:</b>				
Barrel rifling-right hand 1 twist (inches)	12	7	7	7
Muzzle velocity (feet per second)	3,250	3,100	3,100	2,970
Cyclic rate of fire (rounds per minute)	700-800	700-900	800	700-900
<b>MAXIMUM EFFECTIVE RATE OF FIRE:</b>				
Semiautomatic (rounds per minute)	45-65	45	45	45
Burst (3-round bursts) (rounds per minute)	N/A	90	90	90
Automatic (rounds per minute)	150-200	150-200 A3	N/A	N/A
Sustained (rounds per minute)	12-15	12-15	12-15	12-15
<b>RANGE (meters):</b>				
Maximum range	2,653	3,600	3,600	3,600
Maximum effective range:				
Point target	460	550	550	500
Area target	N/A	800	600	600

Table 2-1. Characteristics of the M16-/M4-series weapons.

NOTE: For further technical information, refer to TM 9-1005-319-10 and TM 9-1005-249-10.



## **V. Assault Weapons As A General Threat To Public Safety**

111. As mentioned previously in this report, many of the firearms prohibited by statute directly trace their origins to those developed for use in combat. As such they were never initially intended for general distribution / sale to the public.

112. As tragically demonstrated by recent mass shootings such as the Pulse Nightclub in Orlando Florida in 2016 (49 fatalities, 50+ wounded), the 2017 Las Vegas shooting (60 fatalities, 400+ wounded), the 2022 Uvalde Texas School shooting (21 fatalities + 17 wounded) and the July 4th 2022 shooting in Highland Park (7 fatalities + 48 wounded), the assault weapons (in conjunction with high capacity magazines) as defined under the Act are capable of inflicting significant carnage upon civilians in a short period of time.

113. Rifle caliber Assault Weapons as prohibited under the act pose a significant risk to Law Enforcement Officers. It has been my experience that soft body armor issued to most Uniformed Officers has a “Level II” or “Level IIIA” National Institute of Justice (NIJ) protection rating. These two ratings are suitable for protection against most handgun bullets as those projectiles range up to a 1200FPS (+ or -) velocity. Rifle caliber Assault Weapons (AR & AK type) can, as stated previously in this report, achieve muzzle velocities of 3200FPS (+ or -) which can readily penetrate Level II & IIIA Body Armor (as well as some Level III hard body armor which is not universal standard issue amongst Law Enforcement Agencies nationwide). Not only do the firearms subject to the Act pose a threat to overall public safety they increase the likelihood that first responders charged with stopping such a threat, or attending to wounded citizens, may be injured or killed in the performance of their duty.

114. This online video illustrates the capability of commonly available .223 / 5.56mm caliber ammunition to penetrate Level III body armor. The author / narrator states that this test was performed at a distance of “about seven yards.”

115. <https://www.youtube.com/watch?v=oMYkEMhPsO8>

116. The argument that commercially available AR type rifles are somehow less dangerous or lethal simply because they fire only in semi-automatic mode is misleading. They retain the identical performance capabilities and characteristics (save full automatic capability) as initially intended for use in combat. With even minimal training an operator can fire 40-50 shots per minute in semi-automatic mode. According to the US Army Manual referenced in paragraph 110, the most effective use of the M-16 at ranges beyond 25 yards is rapid semi-automatic fire. Not full automatic fire.

#### **7-8. RAPID SEMIAUTOMATIC FIRE**

The most important firing technique during modern, fast moving combat is rapid semiautomatic fire. Rapid-fire techniques are the key to hitting the short exposure, multiple, or moving targets described previously. If properly applied, rapid semiautomatic fire delivers a large volume of effective fire into a target area. The soldier intentionally fires a quick series of shots into the target area to assure a high probability of a hit. (Figure 7-10, page 7-8 shows the current training program for rapid semiautomatic fire.)

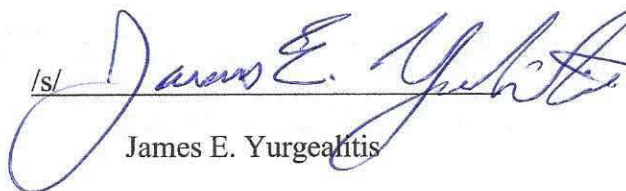
#### **Figure 7-10. Rapid semiautomatic fire training program.**

a. **Effectiveness of Rapid Fire.** When a soldier uses rapid semiautomatic fire properly, he sacrifices some accuracy to deliver a greater volume of effective fire to hit more targets. It is surprising how devastatingly accurate rapid fire can be. At ranges beyond 25 meters, rapid semiautomatic fire is superior to automatic fire in all measures (shots per target, trigger pulls per hit, and even time to hit). The decrease in accuracy when firing faster is reduced with proper training and repeated practice.

117. Such capability combined with the performance characteristics of .223 / 5.56 ammunition originally intended for combat can, and have, resulted in catastrophic civilian mass casualty events.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on 02/27/2023 at MANCHESTER, ND.

/s/   
James E. Yurgealitis

# **EXHIBIT A**

**James E. Yurgealitis**

5004 Roller Rd., Manchester, Maryland 21102  
24 Hour Mobile: (443) 452-7248  
Email: jyurgealitis@gmail.com

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SUMMARY:

Self employed as a Legal and Public Policy Consultant providing Technical Firearms and Forensic Consulting, Testing and Policy Research / Training Services to Corporations, Legal Counsel and the Public Sector

EDUCATION:

B.A., Political Science and Psychology, St. John Fisher University, Rochester, New York – May 1985

PROFESSIONAL EXPERIENCE:

December 2012 to Present: Independent Legal and Policy Consultant / Subject Matter Expert

Currently provide independent consulting services to Corporations, Legal Counsel and Governmental entities in regard to Public Policy and Technical matters relating to Firearms, Firearms Policy, Forensics and Law Enforcement. Current and former clients include the Office of the District Attorney for Cook County Illinois, The City of Sunnyvale, California, The City of Highland Park, Illinois, The Office of the Attorney General for the Commonwealth of Massachusetts and the Center for American Progress, Washington D.C. I have provided sound policy and technical assistance for my clients to include expert testimony which successfully endured the opposition's legal appeals to the U.S. Circuit Court of Appeals and the U.S. Supreme Court.

December 2003 to December 2012: Senior Special Agent / Program Manager for Forensic Services ATF National Laboratory Center (NLC), Beltsville, Maryland. U. S Department of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)

Directed the administration and management of ATF's Forensic Training Programs to include the National Firearms Examiner Academy (NFEA) a 12-month training program for State and Local Forensic Firearm Examiner Trainees. Also managed two additional forensic training programs. Administered a \$1M + budget in accordance with strict ATF and National Institute of Justice (NIJ) guidelines and reporting requirements. Responsible for oversight of all Forensic Firearms related research at the NLC. Supervised a full and part time cadre of fifty-two (52) instructors and administrative personnel. Maintained liaison with commercial firearms and ammunition manufacturers and subject matter experts and ensure that lesson plans and curriculum reflected the latest technical developments in firearms manufacture, forensics and their application to federal and state law. Applied for, received and managed in excess of \$2M in external grants to facilitate uninterrupted delivery of training during internal budget shortfalls. Detailed to the Department of Homeland Security Command Center in 2005 with overall responsibility to coordinate and direct Federal, State and Local Law Enforcement assets during and following Hurricanes "Irene" and "Katrina" and again in 2010 for "Andrew" and "Danielle".

June 1997 - December 2003: Special Agent / Violent Crime Coordinator, ATF Baltimore Field Division, Baltimore, Maryland

Responsible for management of ATF's "Project Disarm", a joint law enforcement initiative between ATF, The United States Attorney's office for the District of Maryland (USAO), the Baltimore City Police Department, the Baltimore City States Attorney's Office and the Maryland State Police. Duties included reviewing over 400 state and local firearms related arrests annually for subsequent referral to the USAO and Federal Prosecution. Managed a caseload of 75 – 100 criminal cases annually. Responsible for selection, referral, follow - up investigation and subsequent indictment and prosecution of armed career criminals. Testified in front of Federal Grand Juries in excess of 75 times annually. Was recognized, and testified, as an expert witness in the Identification, Operability and origin of Firearms and Ammunition in three Federal Judicial Districts. Toured over 25 firearms and ammunition manufacturing facilities in Europe and the United States. Temporarily assigned in 2001 for three months to the 9-11 Task Force investigation in conjunction with FBI Assets. Temporarily assigned to the D.C. Sniper Task Force Intelligence Group in 2002 for two months.

June 1990 – June 1997:

Special Agent, ATF Baltimore Field Division, Baltimore, Maryland

Served in various capacities as a street-level Special Agent. Acted as Group Supervisor and Assistant Special Agent in Charge on numerous occasions. Served on the Washington – Baltimore High Intensity Drug Trafficking Area (HIDTA) task force from 1995 – 1999. Investigated armed narcotics trafficking organizations, seized assets, authored and executed Federal and state search and arrest warrants, conducted surveillance, interviews / interrogations, testified in Federal and state courts as a fact witness, purchased firearms, explosives and narcotics while in an undercover capacity, investigated fatal bombings and arsons, firearms trafficking, alcohol and tobacco trafficking, homicide, fraud and gun store burglaries. Also while detailed for 8 months as the Public Information Officer authored press releases, provided interviews to local and national print and television media outlets and made presentations to local and national public and special interest groups and associations.

April 1989 – June 1990 and July 1986 – March 1987: Special Agent, United States Department of State, Diplomatic Security Service (DSS), Washington Field Office, Rosslyn, VA

Conducted investigations of violations of Federal Law under the department's purview to include Passport and Visa Fraud, Illegal trafficking of restricted firearms and war materials to prohibited countries, human trafficking, seized assets, authored and executed State, local and Federal Arrest and Search Warrants, testified in Federal Court as a fact witness, detailed on an as needed basis to the Dignitary Protection Division as Agent in Charge of multiple protective details for visiting and resident foreign dignitaries, temporarily assigned to support Physical and Personal Protective Security in various U.S. Embassies overseas on an as needed basis, detailed to the Secretary of State Protective Division on an as needed basis to supervise agents assigned to augment the permanent protective detail.

March 1987-February 1989: Special Agent, DSS, Secretary of State Protective Division, Washington, DC

Served in various capacities as Acting Agent in Charge, Acting Shift Leader, Lead Advance Agent and Shift Agent. Responsibilities included close personal protection of the Secretary of State both domestically and overseas, extensive foreign travel to facilitate and prepare security arrangements for overseas visits to include Presidential Summit meetings, liaison with foreign host government officials to plan and solicit assistance with security arrangements, supervision of agents temporarily assigned to augment the detail, liaison with U.S Government Intelligence Agencies and other Federal, State and Local Law Enforcement Agencies to identify and protect against potential threats to the Secretary of State.

CLEARANCES: Top Secret March 1986 valid through February 2015. Numerous prior SCI Clearances.

TEACHING EXPERIENCE:

- Instructed at the Federal Law Enforcement Training Center (FLETC), for ATF and other Federal Law Enforcement Agencies
- Instructed at the International Law Enforcement Academy (ILEA) in Budapest, Hungary
- Instructed for numerous State, local and / or regional law enforcement agencies both in the United States, Canada and Central America

LINKEDIN PROFILE AND ENDORSEMENTS:

[https://www.linkedin.com/in/james-jim-yurgealitis-68618464?trk=nav\\_responsive\\_tab\\_profile\\_pic](https://www.linkedin.com/in/james-jim-yurgealitis-68618464?trk=nav_responsive_tab_profile_pic)

REFERENCES:

Available upon request

# **EXHIBIT B**



**Professional Qualifications of James E. Yurgealitis**  
**Independent Legal, Public Policy and Forensic Consultant**

I, James E. Yurgealitis, being duly sworn, depose and state:

- 1.) That I was previously employed as a Senior Special Agent / Program Manager with the Bureau of Alcohol, Tobacco Firearms & Explosives, (ATF) United States Department of Justice, and had been so employed since 1990. Prior to 1990 I was employed as a Special Agent with the Bureau of Diplomatic Security, (DSS) United States Department of State and had been so employed since 1986.
- 2.) I have a Bachelor of Arts Degree in Political Science and Psychology from St. John Fisher College, Rochester, New York.
- 3.) I am a graduate of the Federal Law Enforcement Training Center, Glynco, Georgia, the Criminal Investigator Training Program, Bureau of Diplomatic Security New Agent Training, and the Bureau of ATF New Agent Training Program.
- 4.) I have completed the Firearms Interstate Nexus Training Program conducted by the Firearms Technology Branch, ATF Headquarters, Washington, D.C.
- 5.) I have completed both Advanced Interstate and European Nexus Training conducted by ATF in conjunction with several domestic and European firearm manufacturers.
- 6.) I have testified in excess of 200 times before Federal Grand Juries regarding the classification, operability, and commerce of firearms and / or ammunition.
- 7.) I have previously qualified as an expert witness regarding the origin, operability / classification and interstate movement of firearms and ammunition in U.S. District Court for the District of Maryland, U.S. District Court for the District of Delaware and the Circuit Court For Baltimore City, Maryland.
- 8.) I have conducted regular training for local, state and federal law enforcement agencies both domestically and overseas regarding firearms classification, operability and firearms statutes.
- 9.) I maintain a personal library of books, printed material and documents that relate to the field of firearms, ammunition, and firearms classification, attend local and national trade shows and professional association meetings, and regularly review periodicals relating to firearms and ammunition.
- 10.) I attend trade shows, maintain contact with, and regularly consult with other persons, to include published authors and recognized experts in the origin, identification and classification of firearms and ammunition.
- 11.) I have, during my tenure with ATF, personally examined in excess of five thousand

Qualifications Of James E. Yurgealitis contd.

firearms to determine their origin and classification and operability, and to facilitate the tracing of those firearms.

I have toured production facilities for numerous firearms and ammunition manufacturers. The tours were conducted by corporate historians, corporate officers, or production engineering personnel.

Domestic Firearm Manufacturers:

Bushmaster Firearms, Ilion, NY, USA  
Colt, New Haven CT, USA (4x)  
H&R 1871 Inc., Chicopee, MA, USA (2x)  
Marlin, North Haven CT, USA (4x)  
O.F. Mossberg & Sons, North Haven, CT, USA (4x)  
Remington Firearms, Ilion, NY, USA  
Savage Arms Inc., Westfield, MA, USA (4x)  
Sig-Sauer / SIGARMS Inc., Exeter, NH, USA (3x)  
Smith and Wesson, Springfield, MA, USA (4x)  
Sturm Ruger, Newport, NH, USA (4x)  
Yankee Hill Machining, Florence, MA, USA

Foreign Firearm Manufacturers:

Carl Walther GmbH, Ulm, Germany  
Ceska Zbrojovka (CZ), Uhersky Brod, Czech Republic  
Fegarmy (FEG), Budapest, Hungary  
F.N Herstal S.A., Herstal, Belgium  
Glock GmbH, Deutsch-Wagram, Austria  
Heckler & Koch GmbH, Oberndorf au Neckar, Germany  
J.P. Sauer & Sohn GmbH, Eckernforde, Germany

Domestic Ammunition Manufacturers:

Fiocchi Ammunition, Ozark, MO, USA  
PMC, Boulder City, NV, USA  
Remington, Lonoke, AR, USA (4x)  
Sierra, Sedalia, MO, USA  
Starline Brass, Sedalia, MO, USA

European Proof Houses

Beschussamt Ulm, (Ulm Proofhouse) Ulm, Germany  
Beschusstelle Eckernforde, (Eckernforde Proofhouse) Eckernforde, Germany  
Czech Republic Proofhouse, Uhersky Brod, Czech Republic  
Liege Proofhouse, Liege, Belgium

Qualifications Of James E. Yurgealitis contd.

I have been allowed regular access to the following reference collections:

Bureau of Alcohol, Tobacco Firearms and Explosives Reference Collection, Martinsburg, West Virginia, USA consisting of 5,000+ firearms

Liege Proofhouse, Liege, Belgium consisting of 1,000+ ammunition cartridges

Springfield Armory National Historic Site Firearms Collection, Springfield, MA, USA consisting of 10,000+ Firearms

Smithsonian Institution (Museum of American History) Firearms Reference Collection Washington, DC, USA, consisting of 4000+ firearms

Wertechische Studiensammlung des BWB, (Federal Defense Procurement Bureau Museum) Koblenz, Germany consisting of 10,000+ Firearms

I have toured the following museums:

Heeresgeschichtliches Museum, (Museum of Military History), Vienna, Austria

Hungarian Military Museum, Budapest, Hungary

Springfield Armory National Historic Site, Springfield, MA, USA

United States Air Force Museum, Dayton, OH, USA

United States Army Ordnance Museum, Aberdeen Proving Ground, Aberdeen, MD, USA

United States Military Academy Museum, West Point, NY, USA

United States Naval Academy Museum, Annapolis, MD, USA

Wertechische Studiensammlung des BWB, (Federal Defense Procurement Bureau Museum) Koblenz, Germany

Membership in Professional Organizations:

Member, International Ammunition Association (IAA)

Technical Advisor (pending approval), Association of Firearm and Toolmark Examiners (AFTE)

Member, Federal Law Enforcement Officers Association (FLEOA)